RECORD OF DECISION

Boston & Maine Wastewater Lagoons
Iron Horse Park
North Billerica, Massachusetts

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for the Boston & Maine Wastewater Lagoons at the Iron Horse Park Superfund site in North Billerica, Massachusetts. The remedial action was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency Plan, 40 CFR 300 et seq., 47 Federal Register 31180 (July 16, 1982), as amended. The Region I Administrator has been delegated the authority to approve this Record of Decision.

The Commonwealth of Massachusetts has concurred on the selected remedy and has determined that it will attain applicable or relevant and appropriate Massachusetts laws and regulations.

STATEMENT OF BASIS

This decision is based on the Administrative Record for the site developed in accordance with Section 113(k) of CERCLA. The attached index identifies the items which comprise the Administrative Record.

The Administrative Record is available for public review at the Billerica Public Library and the EPA Region I Waste Management Division Records Center at 90 Canal Street in Boston.

DESCRIPTION OF THE SELECTED REMEDY

Scope and Role of Operable Units in the Response Action

The response action for the B&M Lagoons is being conducted as an operable unit for the cleanup of the contaminated soil and sludges found in and around the lagoons. It is a source control remedy that is consistent with achieving a permanent remedy for the Site. The remediation of groundwater is not part of this response action; however, the cleanup of the soil and sludges will be consistent with future groundwater remedies and will ensure that releases of hazardous substances from the soil and sludges into groundwater are mitigated. An operable unit is a discrete portion of an entire response, that decreases a release, threat of release, or pathway of exposure.

Components of the Selected Remedy

The selected remedy is a source control response action for the B&M Lagoons. It includes: treating the contaminated soil and sludge from the lagoons by bioremediation; returning the treated material to the lagoon area, covering it with clean soil and establishing a vegetative cover; and decontaminating the lagoon system's piping and pumps. The remedy assumes that the discharge to the lagoons will cease.

DECLARATION

The selected remedy is protective of human health and the environment, attains federal and State requirements that are applicable or relevant and appropriate for this remedial action and is cost-effective. This remedy satisfies the statutory preference for remedies that utilize treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances. In addition, this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Sept 15, 1988
Date

Paul S. Keough, Acting
Michael R. Deland
Regional Administrator

RECORD OF DECISION SUMMARY
BOSTON & MAINE WASTEWATER LAGOONS AT IRON HORSE PARK

TABLE OF CONTENTS

RECORD OF DECISION SUMMARY
BOSTON & MAINE WASTEWATER LAGOONS AT IRON HORSE PARK

LIST OF EXHIBITS

LIST OF TABLES

APPENDICES

RECORD OF DECISION SUMMARY
BOSTON & MAINE WASTEWATER LAGOONS AT IRON HORSE PARK

I. SITE NAME, LOCATION AND DESCRIPTION

This Record of Decision (ROD) is for the cleanup of the Boston and Maine Wastewater Lagoons (the B&M Lagoons) at the Iron Horse Park Superfund site (the Site) in North Billerica, Massachusetts.

The B&M Lagoons are a series of lagoons that receive untreated industrial and sanitary wastewater from the manufacturing and railroad maintenance facilities in the Iron Horse Park industrial complex. They were built and put in use around 1915 and have been in operation since then. The B&M Lagoons are operated by the Boston & Maine (B&M) Corporation, a subsidiary of Guilford Transportation Industries, Inc. The B&M Lagoons and the surrounding area are located within a 150-acre parcel of land that B&M Corporation sold to the Massachusetts Bay Transportation Authority (MBTA) in 1976. The MBTA uses most of this land to operate their passenger rail service. B&M Corporation leases some of the property from MBTA to conduct their present operations.

Investigations of the B&M Lagoons have identified contamination in sludge located on the lagoon bottoms, as well as contamination in piles of soil and sludge dredged from the lagoons. The primary contaminants of concern for the B&M Lagoons are polyaromatic hydrocarbons, volatile organic compounds, metals, and other chemical compounds.

The B&M Lagoons comprise just one part of the Iron Horse Park Superfund site. The entire Site consists of approximately 552 acres of land in North Billerica, near the Tewksbury town line (see Exhibit 1). The Site is an active industrial complex and railyard with a long history of activities that have resulted in contamination of soils, groundwater, and surface water. The Site includes open storage areas, landfills, and lagoons.
A more complete description of the Site, including the B&M Lagoons, can be found in the Phase 1B Remedial Investigation Report at pages 1-1 to 1-14.

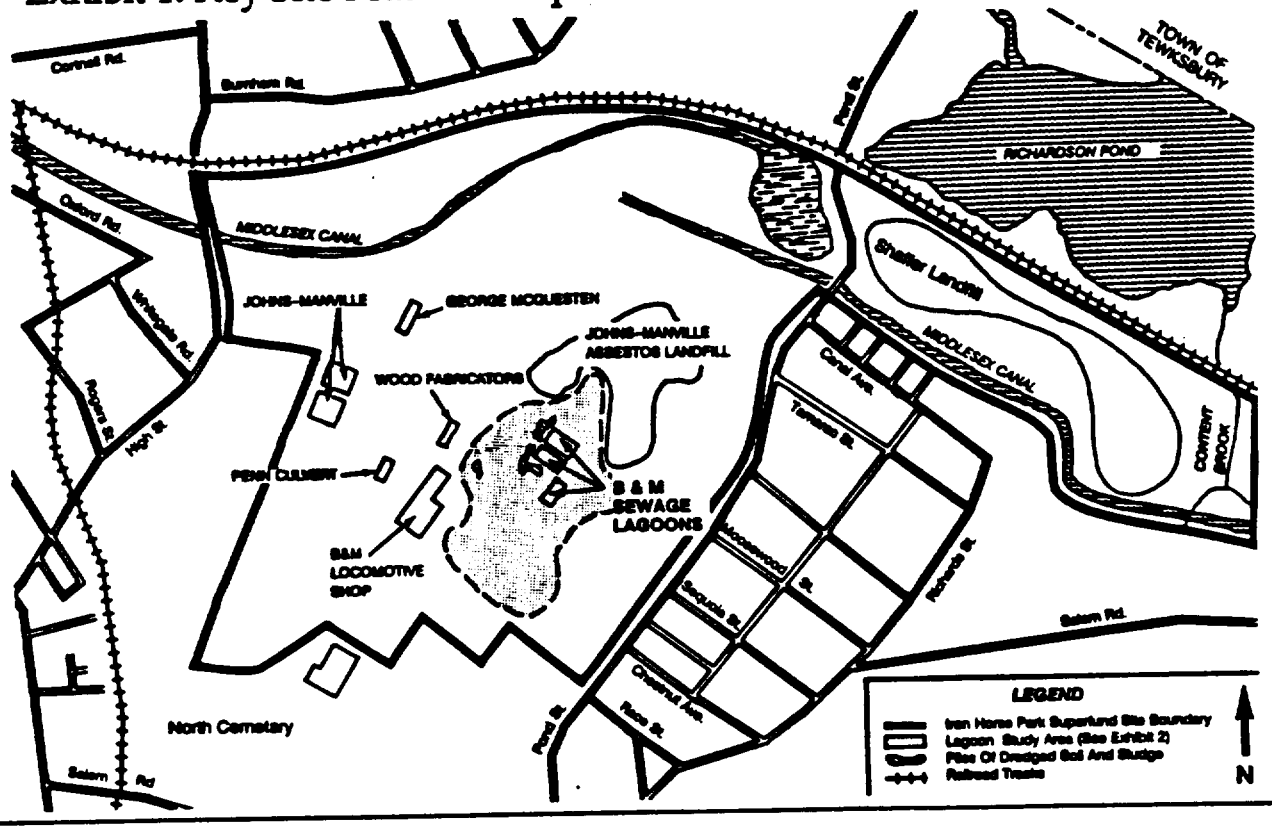
II. Site HISTORY AND ENFORCEMENT ACTIVITIES

A. Response History

The Site was placed on the National Priorities List (NPL) in September 1984 following investigations by the Massachusetts Department of Environmental Quality Engineering (DEQE) in the early 1980s and a Site Investigation Report completed by the NUS Corporation for EPA in August 1984.

In August 1984, EPA under its removal authority, covered a portion of the Site known as the Johns-Manville Asbestos

Exhibit 1: Key Site Features Map: Iron Horse Park Site, Billerica, MA



Landfill, with gravel and topsoil to prevent asbestos in the landfill from becoming airborne.

In 1985, EPA began evaluations of the Site to determine the nature and extent of contamination. Under the first phase of the evaluation, EPA conducted a broad study of the Site to define the potential problem areas. This study was entitled the Phase 1A Remedial Investigation (RI), and was conducted from September 1985 to July 1987. As a result of the Phase 1A RI, EPA concluded that the size and complexity of the Iron Horse Park Site necessitated using a phased approach to study it, and to determine what cleanup work may be needed. Under this approach, the Site has been separated into a number of different problem areas. Where it is possible, the areas are studied and decisions on how to clean them up are made as operable units. An operable unit is a discrete portion of an entire response action that, by itself, decreases a release, threat of release, or pathway of exposure.

The B&M Lagoons and the surrounding area are the first operable unit for the Site. This operable unit addresses the contaminated soil and sludge in the lagoons and dredged from them. In August 1987, EPA began work on a second remedial investigation that focused on the nature and extent of contamination in and around the B&M Lagoons. EPA completed this study, referred to as the Phase 1B Remedial Investigation, in May 1988. In addition to the Phase 1B RI, the Feasibility Study (FS) of potential remedial alternatives for the cleanup of the B&M Lagoons was issued in June 1988.

In addition to the study of the B&M Lagoons, EPA and DEQE are investigating the Shaffer Landfill as an operable unit. Also, other portions of the Site, including site-wide groundwater remediation, will be addressed as part of future site investigations.

A more detailed description of the Site history can be found in Section 1.1 of the Phase 1A RI and also in Section 1.2 of the Phase 1B RI.

B. Enforcement History

In July 1984, EPA notified B&M Corporation, Manville Corporation and the MBTA of their potential liability for response actions taken and to be taken at the Site. These parties were given the opportunity to undertake response actions, including completion of the remedial investigations and feasibility study. They declined to do the work at that time.

In December 1984, EPA notified five other parties of their potential liability for response actions taken and to be taken at the Site. These parties also declined to undertake response actions.

After completion of the Phase 1B RI, on June 22, 1988, EPA notified B&M Corporation, BNZ Materials, Inc., and the MBTA of their potential liability with respect to the B&M Lagoon remediation. On July 14, 1988, Manville Corporation was also noticed for the B&M Lagoons.

Negotiations with potentially responsible parties will not commence until after the remedy selection process is complete and special notice letters have been issued pursuant to Section 122(e) of CERCLA.

In addition to the federal enforcement efforts, Massachusetts has issued numerous violation notices and administrative orders to

several parties within the Iron Horse Park industrial complex for a variety of environmental problems. In May 1985, the Massachusetts Department of Environmental Quality Engineering (DEQE) issued an Administrative Order to the B&M Corporation requiring them to stop discharging wastewater to the B&M Lagoons. Such discharges were found to violate Massachusetts' ground water discharge permit requirements. B&M did not meet the schedule stipulated in the 1985 Order that required cessation of the discharge. As a result, a second Administrative Order was issued in February 1988 with a revised project schedule that requires the B&M Corporation to stop the discharges to the lagoons by the end of 1988. The 1988 Order also added penalty provisions for non-compliance.

In July 1988, DEQE's Division of Water Pollution Control reviewed and approved the engineering plans submitted by B&M Corporation for the tie-in of the discharge to the Town of Billerica's sewer system. Given this approval, EPA believes that construction will begin shortly and the 1988 Order's compliance schedule will be met. Should the discharge not cease pursuant to this Administrative Order, EPA has independent authority under CERCLA to require the discharge to the B&M Lagoons be stopped.

III. COMMUNITY RELATIONS

Through the Site's history, community concern and involvement has been high. A local community group, the Superfund Action Committee (SAC), holds regularly scheduled meetings with EPA, the DEQE and local officials to follow response activities at the Site. Additionally, EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings. A community relations plan was developed and implemented in August 1985 to address community concerns and to keep citizens involved in activities during response actions.

The Agency published a notice and brief analysis of the Proposed Plan for the remediation of the B&M Lagoons in the Billerica Minute-Man on June 2, 1988, and made the plan available to the public at the Billerica Public Library.

On June 8, 1988, EPA held an informational meeting to discuss the results of the Phase 1B Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From June 9, 1988, to July 15, 1988, the Agency held a five-week comment period to accept public comment on the alternatives presented in the Feasibility

Study and the Proposed Plan and on any other documents previously released to the public. On June 23, 1988, the Agency held a public hearing to accept any oral comments. A summary of the comments received by EPA and EPA's responses to those comments are included in the Responsiveness Summary attached as Appendix A.

IV. SCOPE AND ROLE OF OPERABLE UNITS IN THE RESPONSE ACTION

The response action for the B&M Lagoons is being conducted as an operable unit for the cleanup of the contaminated soil and sludge. It is a source control remedy that addresses a discrete contaminant source. The active remediation of groundwater is not part of this response action; however, the cleanup of the soil and sludges will be consistent with future groundwater remedies and will ensure that releases of hazardous substances from the soil and sludges into groundwater are mitigated.

Because of the complexity of the Site and the discrete nature of the problem with the B&M Lagoons (contamination is found on the lagoon bottoms or in well defined piles around the lagoons), cleanup as an operable unit is appropriate and consistent with the entire response for the Site. The contaminant levels in the wastes from the lagoons will be reduced and exposure will be eliminated to ensure protection of human health and the environment. Additionally, because the ongoing discharge to the lagoons will be stopped and leaching of contamination from the treated wastes will be minimal, the operable unit for the B&M Lagoons is consistent with any future site-wide groundwater remediation.

In addition to the B&M Lagoons, EPA is investigating the Shaffer Landfill as a second operable unit and will address other portions of the Site, including site-wide groundwater, for subsequent remedial actions.

V. B&M LAGOONS CHARACTERISTICS

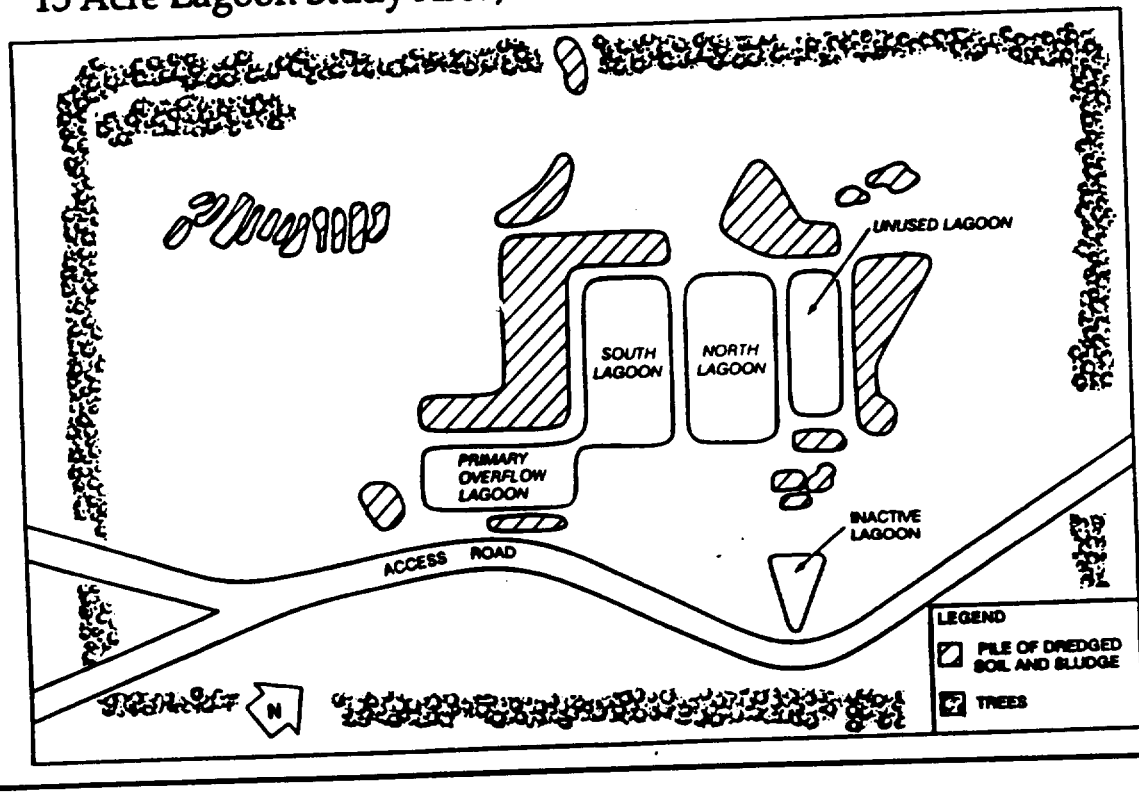
Piles of dredged soil and sludge from the lagoons and groundwater in the vicinity of the lagoons are contaminated with hazardous substances. The significant findings of the investigation of the nature and extent of contamination found are summarized below.

B&M WASTEWATER LAGOONS

Two lagoons, referred to as the North and South lagoons, continue to receive wastewater from the Iron Horse Park industrial

complex. In addition, there are an overflow lagoon, one inactive lagoon, and an empty lagoon that was never used (see Exhibit 2). The lagoon system was built in 1915, and has been in operation since that time. Water discharging to the lagoons infiltrates directly into area groundwater.

Exhibit 2:
15 Acre Lagoon Study Area, Iron Horse Park Site, Billerica, MA



The North and South lagoons have a layer of wastewater sludges and soils on their bottoms that is contaminated primarily with low levels of polyaromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), metals and other types of contaminants. The concentrations of contaminants found in the lagoon wastewater and bottom sludge layer are attached in Tables 1 and 2, respectively. The volume of the contaminated sludge found in the lagoon bottoms is approximately 5,200 cubic yards.

In addition to the North and South lagoons, there is an overflow lagoon and an area adjacent to the overflow lagoon that periodically receives wastewater. These areas are usually dry. There is also one inactive lagoon which was used until 1954. Approximately 2,600 cubic yards of material from these locations are contaminated with the same chemical compounds as found in the North and South lagoons.

Finally, there is one lagoon that was excavated between 1973 and 1976, but has never been used. There is no contamination in this unused lagoon.

TABLE 1

CONTAMINANT TYPES AND LEVELS
FOUND IN LAGOON WASTEWATERS

Contaminants	Contaminant Levels	Detection Frequency
VOCs	(ppb)	
Methylene chloride	<2 - 9	5/10
1,1-Dichloroethene	<2 - 6	5/10
1,1-Dichloroethane	<5 - 8	4/10
1,2-Trans-dichloroethene	3 - 16	7/10
1,1,1-Trichloroethane	19 - 150	10/10
Trichloroethylene	2 - 14	10/10
Benzene	<5 - 9	6/10
Tetrachloroethylene	6 - 69	10/10
Toluene	<5 - 21	6/10
Chlorobenzene	1	1/10
Ethylbenzene	<5 - 26	2/10
Xylenes	<4 - 180	6/10
EXTRACTABLES	(ppb)	
Napthalene	<10 - 38	3/10
2-Methylnapthalene	<10 - 42	3/10
Dibenzofuran	<10 - 26	3/10
Flourene	5	1/10
Phenanthrene	<3 - 19	2/10
Anthracene	41	1/10
Flouranthene	14	1/10
Pyrene	10	1/10
Bis(2-ethylhexyl)phthalate	<7 - 23	4/10
Alpha-BHYC	0.19	1/10
Gamma-BHC (lindane)	0.28	1/10
INORGANICS	(ppb)	
Antimony	52	1/10
Arsenic	20	1/10
Barium	36 - 51	10/10
Chromium	<4.5 - 139	7/10
Copper	39 - 102	10/10
Lead	29 - 54	10/10
Mercury	0.3	2/10
Nickel	<3.8 - 8.3	8/10
Selenium	6.6	2/10
Vanadium	<3.9 - 7.6	5/10
Zinc	39 - 197	2/10
Cyanide	<10 - 41	7/10

TABLE 2

CONTAMINANT TYPES AND LEVELS
FOUND IN LAGOON SLUDGES

Contaminants	Contaminant Levels	Detection Frequency
VOCs	(ppb)	
Chloromethane	480	2/8
1,1-Dichloroethane	400	1/8
1,2-Trans-dichloroethene	420	1/8
Chloroform	180	1/8
1,1,1-Trichloroethane	270	1/8
Bromodichloromethane	120	1/8
Trichloroethylene	130	1/8
Benzene	<42 - 290	3/8
Tetrachloroethylene	220	1/8
Toluene	1300	1/8
Chlorobenzene	270	1/8
Ethylbenzene	160	1/8
Xylenes	350	1/8
EXTRACTABLES	(ppb)	
2-Methylnapthalene	<940 - 140,000	7/8
N-Nitrosodiphenylamine	<2,400 - 81,000	2/8
Phenanthrene	<2,400 - 36,000	5/8
Flouranthene	<2,000 - 39,000	5/8
Pyrene	<1,000 - 39,000	6/8
Benzo(b)flouranthene	<760 - 22,000	4/8
Benzo(k)flouranthene	<760 - 22,000	4/8
Benzo(a)pyrene	340	1/8
Bis(2-ethylhexyl)phthalate	<880 - 61,000	8/8
INORGANICS	(ppm)	
Antimony	<8.2 - 82	5/8
Arsenic	4.8 - 102	8/8
Barium	20 - 2300	8/8
Beryllium	0.2	7/8
Cadmium	0.8 - 58	8/8
Chromium	18 - 1790	8/8
Copper	30 - 2570	8/8
Lead	12 - 3390	8/8
Mercury	<0.13 - 2.4	6/8
Nickel	13 - 485	8/8
Selenium	<1.2 - 6.5	2/8
Silver	<2.4 - 30	1/8
Vanadium	7.4 - 61	8/8
Zinc	20 - 2690	8/8
Cyanide	<0.6 - 2.2	1/8

PILES OF DREDGED SOILS AND SLUDGES

The B&M Lagoon area is also characterized by piles of contaminated sludges and soils that were dredged from the lagoon bottoms and disposed of along the lagoon banks. The piles range in height from 6 to 10 feet. Low levels of organic compounds and some metals were found in these piles. A summary of the contaminants in the dredged soil and sludge piles is attached in Table 3. The volume of contaminated soil and sludges in the piles is approximately 20,000 cubic yards.

SURROUNDING SOILS

Soils in the area surrounding the B&M Lagoons were also investigated to determine if dredged soils and sludges from the lagoons were deposited or spread throughout the 15-acre wooded area that surrounds the lagoons. However, EPA found that the dredged materials had not been spread and that the area is free of contamination.

GROUNDWATER

Groundwater near the B&M Lagoons has less than 50 ppb of volatile organic compounds (VOCs) and less than 15 ppb of total extractable compounds. No detectable levels of PAHs were found. The ongoing discharge of wastewater to the lagoons is a source of this contamination. Because contaminants other than those found in the discharge were detected in groundwater, there may be other sources of groundwater contamination from other parts of the Site in addition to the discharge.

The piles of dredged materials and the sludge in the lagoons do not contribute significantly to groundwater contamination. This conclusion was based on the results of the toxicity characteristic leaching procedure (TCLP) test that indicated these materials did not leach contaminants in significant concentrations. Also, the contaminants found in these materials are generally not found in groundwater.

Section 1.3 of the Feasibility Study contains an overview of the Phase 1B RI for the B&M Lagoons. A complete discussion of the characteristics of the B&M Lagoons can be found in the Phase 1B RI in Sections 4 through 8.

TABLE 3

CONTAMINANT TYPES AND LEVELS FOUND
IN DREDGED MATERIALS

Contaminants	Contaminant Levels	Detection Frequency
VOCs	(ppb)	
methylene chloride	<5 - 360	13/52
acetone	<5 - 680	9/52
2-butanone	2	1/52
chloroform	<4 - 7	2/52
1,1,1-trichloroethane	40	1/52
1,1,2-trichloroethane	<5 - 10	6/52
trichloroethylene	10	1/52
tetrachloroethylene	110	1/52
toluene	<1 - 6	8/52
ethylbenzene	<1 - 33	7/52
xylenes	<2 - 390	12/52
EXTRACTABLES	(ppb)	
1,2-Dichlorobenzene	94	1/52
Methylphenol	110	1/52
Benzoic acid	<330 - 1,400	7/52
Pentachlorophenol	190	1/52
N-Nitrosodiphenylamine	<73 - 160	5/52
Di-N-butylphthalate	<330 - 31,000	7/52
Butylbenzylphthalate	400	1/52
Bis(2-ethylhexyl)phthalate	<71 - 1,600	6/52
Napthalene	<98 - 170	2/52
2-Methylnapthalene	<70 - 220	8/52
Acenapthalene	<47 - 800	5/52
Acenapthene	<140 - 370	2/52
Dibenzofuran	<91 - 440	2/52
Fluorene	<110 - 770	3/52
Phenanthrene	<51 - 12,000	22/52
Anthracene	<46 - 1,000	15/52
Fluoranthene	<52 - 4,200	27/52
Pyrene	<45 - 7,100	28/52
Chrysene	<65 - 1,900	12/52
Benzo(a)anthracene	<75 - 1,600	11/52
Benzo(b)fluoranthene	<80 - 1,100	11/52
Benzo(k)fluoranthene	<80 - 1,100	9/52
Benzo(a)pyrene	<180 - 910	7/52
Indeno(1,2,3-cd)pyrene	<62 - 610	5/52
Benzo(g,h,i)perylene	<81 - 840	5/52
4,4'-DDT	<16 - 74	2/52

TABLE 3 (Cont'd)

CONTAMINANT TYPES AND LEVELS FOUND
IN DREDGED MATERIALS

Contaminants	Contaminant Levels	Detection Frequency
INORGANICS	(ppm)	
Antimony	<0.7 - 11	5/52
Arsenic	1.3 - 19	46/52
Barium	<5.4 - 270	50/52
Beryllium	<0.2 - 0.59	9/52
Cadmium	<0.8 - 9	22/52
Chromium	4 - 282	50/52
Copper	35 - 1,240	51/52
Lead	3.0 - 1,260	52/52
Mercury	<0.05 - 0.76	18/52
Nickel	6.3 - 46	44/52
Selenium	0.8 - 7.5	5/52
Silver	<0.9 - 8	26/52
Vanadium	<3.5 - 35	46/52
Zinc	4 - 468	52/52
Cyanide	<0.5 - 1.3	11/52

VI. SUMMARY OF SITE RISKS

The probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the B&M Lagoons was estimated and summarized in the Endangerment Assessment (EA). Incremental lifetime cancer risks and a measure of the potential for noncarcinogenic adverse health effects were estimated for two exposure scenarios and a number of potential pathways. The contaminants of concern for cancer risks are PAHs, VOCs and arsenic. For noncarcinogenic adverse health affects, lead and other metals are the contaminants of concern because of their elevated concentrations.

The two exposure scenarios evaluated - an average and plausible maximum - reflect the potential for exposure to hazardous substances based on the characteristic uses and location of the lagoons were evaluated. The average case scenario represents the most probable risk and assumes that exposure occurs at the average contaminant concentration found in the wastes. The plausible maximum scenario represents a very conservative, worst-case situation. In evaluating the plausible maximum scenario, the number of times a receptor could be exposed was increased over the average case scenario and it is assumed that all exposure events occur at the maximum contaminant concentration found. The current and future risks that the B&M Lagoons may pose based upon various exposure pathways are summarized below. These results assume that no remediation has occurred.

CURRENT USE

Excess lifetime cancer risks, from the average to a plausible maximum, and noncarcinogenic hazard risks posed by the lagoon area under the current industrial use of the area are due to direct contact with contaminated sludge and soil dredged from the lagoons. Groundwater ingestion is not an exposure pathway, as currently there is no known use of groundwater for residential or industrial facilities near this portion of the Site. The current risks posed are:

	Cancer Risks	Hazard Risks
Direct Contact:		
Sludge and Soil Piles	$3x10^{-8}$ to $2x10^{-6}$	<1

Direct contact with the wastes may pose excess lifetime cancer risks greater than 1×10^{-6}, but only under the plausible maximum scenario. Potential hazard risks associated with noncarcinogens are less than 0.2 under all exposure scenarios. A hazard risk of

0.2 represents exposure to noncarcinogenic contaminants at concentrations that are one-fifth of the levels that EPA has set as acceptable intake levels. Because of this, the noncarcinogenic risks are not significant.

FUTURE USE

The excess lifetime cancer risks and hazard risks under average to plausible maximum scenarios to on-site workers and hypothetical on-site residents were evaluated. In the future use scenario, two additional pathways of exposure were included: direct contact with lagoon-bottom sludges when the discharge has ceased and ingestion of groundwater. Although groundwater remediation is not part of this response action, the groundwater ingestion pathway was considered to ensure that the cleanup of the lagoons as an operable unit minimizes the release of contaminants to groundwater and does not result in further degradation of groundwater quality, and is consistent with future groundwater cleanup actions.

Potential exposure pathways considered light industrial and residential development. Although residential housing was considered and evaluated, given the industrial setting of the Site and the close proximity of the B&M Lagoons to the Johns-Manville Asbestos Landfill, the development of housing would be unlikely. In evaluating any future scenarios, it was assumed that all discharges to the lagoon system have ceased. The potential future risks for on-site workers are:

	Cancer Risks	Hazard Risks
Direct Contact:		
Sludge and Soil Piles	$7x10^{-7}$ to $2x10^{-5}$	<1
Lagoon Sludge	$2x10^{-6}$ to $3x10^{-4}$	<1
Ingestion:		
Groundwater	$7x10^{-7}$ to $8x10^{-6}$	<1

For the hypothetical on-site residents, the risks are:

	Cancer Risks	Hazard Risks
Direct Contact:		
Sludge and Soil Piles	$7x10^{-6}$ to $1x10^{-4}$	<1
Lagoon Sludge	$2x10^{-5}$ to $2x10^{-3}$	<1

Ingestion:

Groundwater	$1x10^{-5}$ to $8x10^{-5}$	1

In the future, the contaminants in the B&M Lagoon area could pose potential health risks to on-site workers and residents from possible direct contact with contaminated soils and sludges. Also, the ingestion of groundwater in the area around the B&M Lagoons could present a potential health threat.

Although the risk due to inhaling contaminants was estimated at greater than $1x10^{-6}$ in the Endangerment Assessment, information collected by EPA and the State in three separate studies, including actual monitoring by the DEQE in August 1985 at the B&M Lagoons, indicated that this pathway of exposure is not a concern.

The potential risks to flora and fauna in the area in and around the B&M Lagoons was also evaluated. Birds and mammals inhabiting the area are probably not at risk due to exposure to contaminants that are present.

The risks posed by the B&M Lagoons are summarized in Section 2.3 of the Feasibility Study. The complete Endangerment Assessment is found in Appendix E of the Phase 1B Remedial Investigation.

VII. NO SIGNIFICANT CHANGES TO SELECTED ALTERNATIVE

EPA, under Section 117(b) of CERCLA, is required to publish an explanation if there is a significant change between the preferred alternative presented in the Proposed Plan and the final remedy decision. The remedial alternative selected in this Record of Decision is the same as that presented in the Proposed Plan, therefore, no documentation or explanation of changes is required.

VIII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Prior to the passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA), actions taken in response to releases of hazardous substances were conducted in accordance with CERCLA, as enacted in 1980, and the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, dated November 20, 1985. Until the NCP is revised to reflect SARA, the procedures and standards for responding to releases of

hazardous substances, pollutants and contaminants must be in accordance with Section 121 of CERCLA and, to the maximum extent practicable, the current NCP.

Under its legal authorities, EPA's primary responsibility at Superfund Sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is granted; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a statutory preference for remedies that utilize treatment to permanently and significantly reduce the volume, toxicity or mobility of hazardous substances. Response alternatives were developed to be consistent with these Congressional mandates.

A number of potential exposure pathways were analyzed for risk and threats to public health and the environment in the Endangerment Assessment. Guidelines in the Superfund Public Health Evaluation Manual (EPA, 1986) regarding development of design goals and risk analyses for remedial alternatives were used to assist EPA in the development of response actions. As a result of these assessments and a review of applicable or relevent and appropriate requirements (ARARS), remedial response objectives were developed to mitigate existing and future threats to human health and the environment. These response objectives are:

- To protect human health and the environment by stopping the ongoing discharge to the lagoons.

- To protect human health and the environment by reducing current and future risks due to contaminant levels found in soils and sludges from the B&M Lagoon area.

- To protect human health and the environment by reducing current and future risks due to releases of contaminants to groundwater, surface water and air.

- Meet State and federal applicable or relevant and appropriate environmental requirements (ARARs).

B. Technology and Alternative Development and Screening

Remedial alternatives were developed and screened using CERCLA, the NCP, and EPA guidance documents, and the "Interim Guidance on Superfund Selection of Remedy" [EPA Office of Solid Waste and Emergency Response (OSWER)], Directive No. 9355.0-19 (December 24, 1986). Treatment alternatives were developed to provide potential remedies ranging from an alternative that, to the degree possible, would eliminate the need for long-term management (including monitoring) to alternatives involving treatment that would reduce the mobility, toxicity, or volume of the hazardous substances as their principal element. In addition to treatment alternatives, containment options involving little or no treatment and a no-action alternative were developed in accordance with Section 121 of CERCLA.

Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. In addition to these factors and the other statutory directives of Section 121, the evaluation and selection process for the B&M Lagoons was guided by the EPA document "Additional Interim Guidance for FY '87 Records of Decision" dated July 24, 1987. This document provides direction on the consideration of SARA cleanup standards and sets forth nine factors that EPA should consider in its evaluation and selection of remedial actions. The nine factors are:

1. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
2. Long-term Effectiveness and Permanence.
3. Reduction of Toxicity, Mobility or Volume.
4. Short-term Effectiveness.
5. Implementability.
6. Community Acceptance.
7. State Acceptance.
8. Cost.
9. Overall Protection of Human Health and the Environment.

In the Feasibility Study, a three-part technology and alternative development and screening process was followed. First, technologies were identified, assessed and screened to determine acceptable engineering practices that could provide implementable, feasible and realistic remedies. Second, the technologies were combined into nine remedial alternatives and screened to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Seven of the nine alternatives were retained. Finally, following the initial screening, a detailed analysis of the remaining seven alterna-

tives was conducted utilizing the nine factors discussed above.

IX. DESCRIPTION AND EVALUATION OF THE REMEDIAL ALTERNATIVES

This section presents a narrative summary and brief evaluation of each alternative retained for the detailed analysis according to the evaluation criteria described above.

Alternative #1: No-Action. The no-action alternative would involve leaving the B&M lagoon area just as it is; that is, once the wastewater discharge to the lagoons has ceased, no-action would be taken. The piles of dredged sludges and soils would remain unaltered. The sludges and soils in the North and South lagoons would also remain unaltered, with the exception of eventually becoming dried out, once the lagoons drain.

This alternative would not be protective because it does not result in a reduction to the risks posed by the B&M Lagoons and would not meet ARARs. Additionally, this alternative does not utilize treatment as a principle element and, consequently, there would be no reduction in the mobility, toxicity or volume of the wastes.

Estimated Time for Construction: None
Estimated Total Cost: None

Alternative #2: Closure of Lagoons with a Permeable Cap. This alternative would involve moving the 23,000 cubic yards of contaminated soils and sludges from the piles, the overflow lagoon area and the abandoned lagoon, and placing them on top of the sludges in the North and South lagoons. Then, a cover, referred to as a cap, would be constructed over the sludge deposits. This cap would be permeable (i.e., water would be able to pass through it). The cap would consist of 6 inches of clean sandy soil and 6 inches of topsoil. In addition, the cap would be seeded and fertilized to establish vegetation, which would hinder erosion. The cap would prevent direct human contact with the sludge material underneath, and would prevent evaporation of contaminants in the sludge. A fence would be constructed around the lagoon area to prevent access and possible disturbance to the cap. A restriction in the deed to the property would be required so that the area would never be excavated.

Although this alternative would reduce the risks posed by direct contact to the contaminated soil and sludges, it would not attain ARARs. Specifically, the permeable cap would not meet the

relevant and appropriate closure regulations for landfill or surface impoundment covers that require that the cover provide long-term minimization of migration of liquids through the cover. Additionally, this alternative does not utilize treatment as a principal element to reduce the mobility, toxicity or volume of the wastes.

Estimated Time for Construction: 9 months
Estimated Period of Operation: 30-Year Lifetime of Cover
Estimated Total Cost: $546,000

Alternative #3: Closure of Lagoons with an Impermeable Cap. This alternative is similar to alternative #2, in that contaminated materials would be excavated and placed in the North and South lagoons. However, under alternative #3, an impermeable cover that met closure requirements would be placed directly over the contaminated soil and sludge to prevent precipitation from contacting the waste. An 18-inch layer of sand would be placed above the impermeable cover, with a drainage and filter layer in between, to allow precipitation to drain out of the cap. The cap would be topped with 6 inches of topsoil. This impermeable cap would reduce the amount of precipitation that could filter through the waste and carry contaminants into the groundwater and away from the capped area. Long-term monitoring of the groundwater would be conducted, and a fence would be installed around the capped area.

This alternative would be protective of human health and the environment and would attain ARARs. However, this alternative does not utilize treatment as a principle element to reduce the mobility, toxicity or volume of the wastes.

Estimated Time for Construction: 9 months
Estimated Period of Operation: 30 Years
Estimated Total Cost: $1,062,000

Alternative #4: Stabilization and Closure. Under this alternative, contaminated soils and sludges would be excavated and treated on-site by stabilization. A stabilization process involves mixing a hardening agent, called a fixative, with the waste. Cement is an example of a type of fixative that could be used. To implement this alternative, a processing area would be set up near the lagoons and the contaminated soils and sludges would be placed, along with a fixative, in a mixing unit. After stabilization, the treated material would be placed back in the North and South lagoons and covered by a permeable cap. About a fifty percent increase in the volume of the waste would result.

This stabilization process would reduce the mobility of hazardous components in the sludge. If, following stabilization, the wastes are still considered hazardous, then the permeable cap would be upgraded to an impermeable cap design to meet the hazardous waste closure requirements, and a groundwater monitoring program would also be implemented to meet post-closure requirements for hazardous waste facilities.

This alternative would be protective of human health and the environment and would attain ARARs as the closure would be conducted to meet federal and Massachusetts' requirements. Additionally, this alternative, because it utilizes stabilization, meets CERCLA's preference for remedies that use treatment as a principle element to reduce the mobility of the wastes.

Estimated Time For Construction and Operation: 1 1/2 years
Estimated Period of Operation: 30 Years
Estimated Total Cost: $5,201,700

Alternative #5: Bioremediation. This alternative is the selected remedy and is discussed in the following section of this decision document.

Alternative #6: On-Site Incineration. Under this alternative, excavated sludges and soils would be burned in a mobile thermal destruction facility that would be set up on the Site. The extremely high temperatures in the thermal destruction facility would destroy at least 99.99% of the PAHs, VOCs and all other hydrocarbons in the excavated sludges and soils. The exhaust gases from the facility's combustion chambers would be passed through air pollution control devices before being released to the atmosphere to attain all applicable or relevant and appropriate emission standards.

After the incineration process, the treated sludges and soils would be tested to ensure that the residual material is not hazardous. If the treated sludges and soils are not hazardous, they would be used to fill in excavated areas and the North and South lagoons. In the event that these materials are considered hazardous, they would be managed in conformance with applicable or relevant and appropriate requirements.

This alternative would be protective and all ARARs would be attained. Incineration would reduce the mobility, toxicity and volume of contaminants and would achieve a permanent remedy.

Estimated Time for Construction and Operation: 2 Years
Estimated Total Cost: $15,694,500

Alternative #7: Off-Site Disposal in an Approved Hazardous Waste Landfill. This alternative would involve excavating and transporting all sludges and soils from the B&M Lagoon area to an approved off-site hazardous waste landfill. After the contaminated materials are removed, clean soils would be used to fill in the excavated areas. There are currently four approved facilities in the eastern United States to which the wastes could be shipped. These facilities are located in Emelle, Alabama; Model City, New York; Williamsburg, Ohio; and Niagara Falls, New York.

Although this alternative would be protective and could attain ARARs, under CERCLA the off-site disposal of contaminated materials without treatment is the least favored remedial action where practicable technologies are available. Additionally, off-site landfilling does not utilize treatment to reduce the mobility, toxicity or volume of the hazardous constituents.

Estimated Time for Construction and Operation: 1 Year
Estimated Total Cost: $16,900,000

X. THE SELECTED REMEDY

The selected remedy for the B&M Lagoons is a source control remedial action for the contaminated soil and sludges from the lagoons. The remedy will protect human health and the environment by reducing the organic contaminant levels found in the soil and sludges and by eliminating potential exposure routes. Additionally, because the ongoing discharge to the lagoons will be stopped and leaching of contamination from the treated wastes will be minimal, the remedy is consistent with any future site-wide groundwater remediation. Also, to ensure that the remedy continues to be protective, it will be reviewed every five years after initiation of the bioremediation in accordance with Section 121(c) of CERCLA.

A. Description of the Selected Remedy

The selected remedy includes: treating the contaminated soil and sludge from the lagoons by bioremediation; returning the treated material to the lagoon area, covering it with clean soil and establishing a vegetative cover; and decontaminating the lagoon system's piping and pumps. The remedy assumes that the discharge to the lagoons will cease pursuant to State authority.

Groundwater remediation is not part of this remedy because there may be other sources that have not been addressed that may contribute to contamination of groundwater. Site-wide groundwater remediation will be considered in the future.

The bioremediation treatment process is outlined below. The particular bioremediation technology presented serves as the basis for remedial design and subsequent remedial action. The goal of the technology is to achieve the maximum practicable reduction in contaminant concentration. However, another bioremediation technology process can be implemented if approved by EPA and if it is demonstrated to the satisfaction of EPA, through appropriate engineering evaluations, and any necessary lab, bench or pilot-scale testing, that it can achieve at least the same reduction in organic contamination within the five-year time frame as outlined in the process discussed below.

Bioremediation

The bioremediation treatment process uses naturally occurring microorganisms that exist in soil to degrade, or break down organic contaminants, such as PAHs and hydrocarbons, into non-toxic, harmless materials such as carbon dioxide, water, biomass, and humus. The natural action of the microorganisms is enhanced by adding water, essential nutrients and oxygen to the waste materials. This type of treatment is commonly used to manage contaminated wastes similar to those found at the B&M Lagoons.

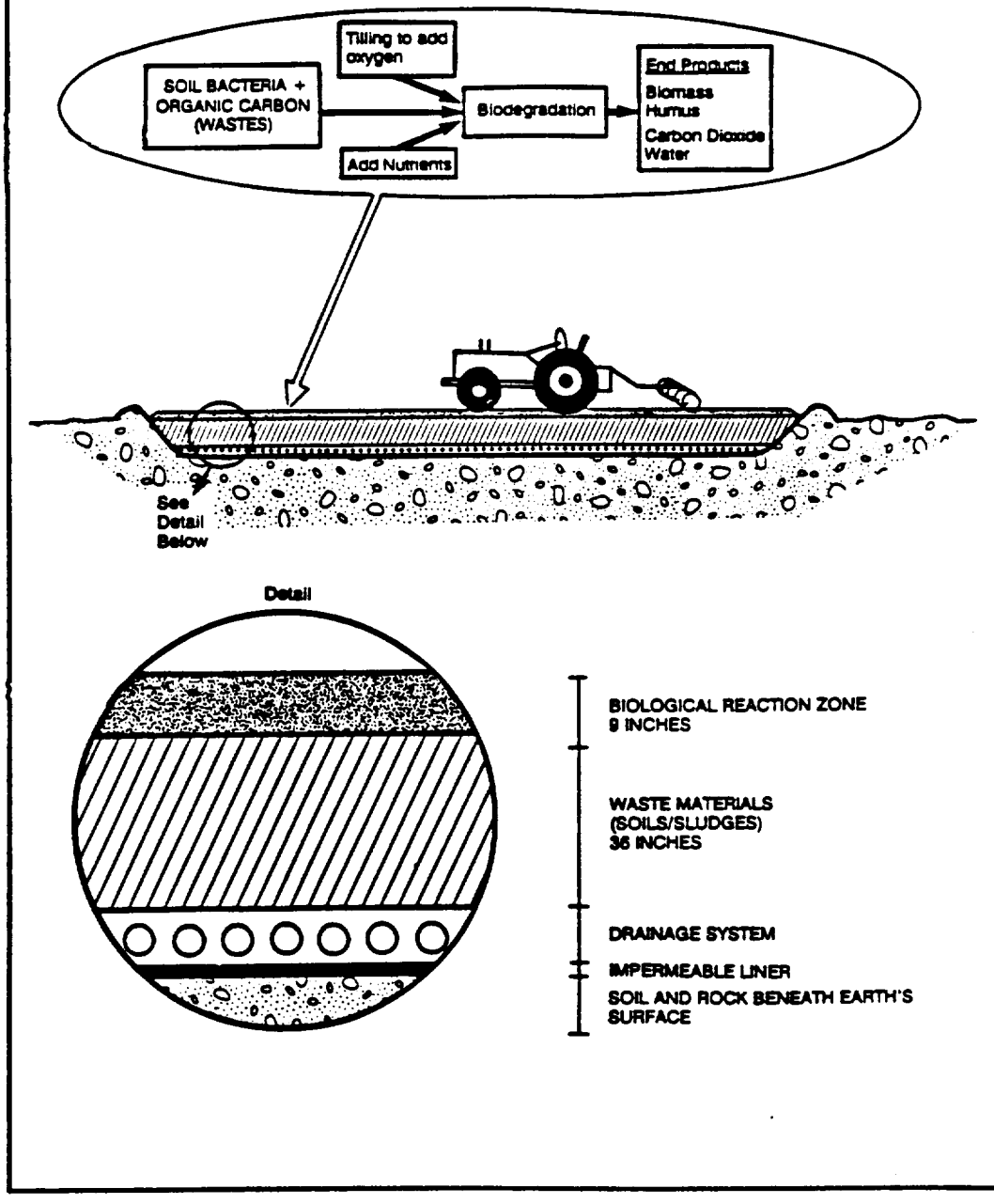
Prior to start-up of the treatment process, appropriate lab, bench or pilot-scale testing will be done to optimize the bioremediation process. Additionally, within the five-year operating period specified, monitoring of the process and further modifications will be implemented to ensure the maximum practicable reduction in hazardous organic constituents.

The 28,000 cubic yards of soil and sludge contaminated by releases of hazardous substances from the B&M Lagoons will be treated by the bioremediation process.

A 5-acre area located near the lagoons will be cleared of trees and a fence will be installed. The area will be excavated to a depth of three feet, and an impermeable (i.e., water would not pass through it) liner will be placed over the area. Once the liner is in place, the contaminated soils and sludges will be placed into the lined area. The top layer of waste will then be tilled to introduce oxygen for the microorganisms to grow, and to degrade the contaminants. Water and fertilizers containing essential nutrients, such as nitrogen and phosphorus, will also be added to the contaminated materials. Limestone may be added

to adjust the acidity and alkalinity of the wastes. The specific water content, nutrient levels and limestone addition will be determined prior to implementing the remedy through appropriate lab, bench or pilot-scale testing. (Refer to Exhibit 3 for a schematic representation of the bioremedition process).

Exhibit 3: Bioremediation Treatment Process



The bioremediation process is effective in breaking down contaminants in the top 6 to 9 inches of soil. Below the level of 9 inches, there is not an adequate supply of oxygen for bioremediation to be effective. Therefore, treatment of the contaminated soil and sludges will be done in layers. Each spring, the upper 6 to 9 inches of waste material, or approximately 6,000 cubic yards, will be bioremediated until the fall, and then returned to the North and South lagoons. The treatment process will be conducted from the spring through the fall, because the bioremediation process is more effective in warmer temperatures. The entire treatment process should take approximately five years to complete.

Based on studies of bioremediation (Bossert and Bartha, 1984), it is expected that up to a 70 to 80% reduction can be realized. With this reduction in contaminant concentration in the wastes, the total excess cancer risks posed by direct contact with the residual materials will be less than $1x10^{-6}$ for the most probable future receptors - i.e., on-site workers and off-site residents. Although residential development of the B&M Lagoon area is not expected, the risks to hypothetical on-site residents were evaluated. This evaluation showed exposure to the treated materials would pose a risk from carcinogens of less than $1x10^{-5}$.

In addition to the significant risk reduction achieved by bioremediation, returning the treated material to the lagoon area and covering it with clean soil will eliminate potential exposure routes making both cancer and non-carcinogenic hazard risks essentially zero.

Additionally, because bioremediation will reduce contaminant levels in the waste, the potential for contaminants to leach from the treated wastes and migrate into the groundwater will be minimal. Bioremediation is, therefore, consistent with any future site-wide groundwater remediation.

A detailed breakdown of the selected remedy's cost is summarized in Table 4.

The cleanup protects human health and the environment by permanently treating the contaminated soils and sludges to the maximum extent practicable. Bioremediation reduces the mobility, toxicity and volume of the hazardous organic constituents in the wastes. The remedy also complies with all applicable or relevant and appropriate requirements (ARARs) set by the Commonwealth of Massachusetts and the federal government, and is cost-effective.

Estimated Time for Construction and Operation: 5 years
Estimated Total Cost: $2,320,000

TABLE 4

BIOREMEDIATION REMEDY COSTS

		Amount
DIRECT CAPITAL COSTS		
1.	Site Preparation	$762,500
2.	Placement of Waste in Treatment Area	210,000
3.	Final Cover	23,000
4.	Restoration of Treatment Area	12,500
		$1,008,000
INDIRECT CAPITAL COSTS		
5.	Construction Contractor	150,000
6.	Design Development	100,000
7.	Superfund Allowance	200,000
		$450,000
ENGINEERING AND CONTINGENCIES		
8.	Engineering (@15%)	217,500
9.	Contingency (@15%)	217,500
10.	Administration (@5%)	72,500
		$507,500
TREATMENT COSTS (Present Worth - 5 Years)		
11.	Treatment Process	64,400
12.	Returning Treated Waste to Lagoon Area	91,700
13.	Process Monitoring	151,600
		$307,700
	Total Capital Costs	$2,273,000
LONG-TERM COVER MAINTENANCE (Present Worth - 30 Years)		
14.	Cover Maintenance	$47,000
	TOTAL REMEDY COSTS	$2,320,000

B. Rationale for Remedy Selection

The remedy was selected based on the assessment of each criterion listed in the evaluation of alternatives section of this document. In accordance with Section 121 of CERCLA, to be considered as a candidate for selection in the ROD, the alternative must be protective of human health and the environment and able to attain ARARs unless a waiver is granted. In assessing the alternatives that met these statutory requirements, EPA focused on the other evaluation criteria, including: short-term effectiveness, long-term effectiveness, implementability, use of treatment to permanently reduce the mobility, toxicity and volume, and cost. EPA also considered the implementability of a remedy and the Commonwealth's and community's acceptance of it. The assessment is summarized in Section 4.0 of the Feasibility Study and discussed below.

The selected remedy provides long-term effectiveness, protectiveness and reduces the mobility, toxicity and volume of the waste sludges and soil by permanently degrading the PAHs and other types of hydrocarbons present through the action of microorganisms. Because there will be no discharges of water from the bioremediation process and necessary measures will be taken to ensure air quality is not impacted and that safety requirements are met, no adverse short-term impacts will occur during implementation of the remedy. Bioremediation is an easily implemented remedy: materials and equipment are readily available and the process has been demonstrated in other similar situations. The remedy will meet federal and State ARARs and is cost-effective in comparison to the other remedial alternatives. The Commonwealth of Massachusetts was consulted during the development of the Remedial Investigation and Feasibility Study, Proposed Plan and this decision document and has provided their concurrence for the selected remedy. Also, as documented in the Responsiveness summary, attached as Appendix A, the community supports the selected remedy.

Based upon this assessment, taking into account the statutory preferences of CERCLA, EPA selected the remedial approach that utilizes bioremediation for the Site.

In all alternatives considered, the ongoing discharge to the lagoons is assumed to have stopped. The present discharge of untreated wastewater to the B&M Lagoons is illegal. The discharge is not permitted as required by the Massachusetts Groundwater Discharge Permit Program (310 CMR 5.00). Moreover, the discharge to the lagoons contains chemical compounds at

concentrations that exceed applicable effluent limitations set by Massachusetts regulations to ensure that groundwater quality is maintained.

Alternatives 1 and 2, No Action and closure of the Site with a permeable cover, would not meet ARARs or provide a protective remedy. Because of this, they were eliminated from further consideration.

The other remedial alternatives that are both protective and attain ARARs were not selected for the reasons noted below.

Alternative # 3, closure of lagoons with impermeable cap, would be protective of human health and the environment and would be constructed to attain ARARs. However, this alternative was not selected because it does not utilize a permanent solution and an alternative treatment technology to the maximum extent practicable to reduce the mobility, toxicity, and volume of the waste material.

Alternative # 4, stabilization and closure, would be protective of human health and the environment and attains ARARs. Although this alternative uses treatment to reduce the mobility of contaminants, it was not chosen because stabilization would result in a substantial increase in the volume of waste material. This would make implementation difficult and, unlike the selected remedy, it would not reduce the concentration of the organic contaminants in the waste or their toxicity. In addition, the cost of this remedy is greater than the selected remedy.

Alternative # 6, on-site incineration, would be protective of human health and the environment. In addition, this alternative utilizes a permanent solution and an alternative treatment technology to the maximum extent practicable and would attain ARARs. Moreover, almost a 100% reduction in the hazardous organic constituents would be achieved by incineration. Incineration was not selected because it is significantly more expensive than the selected remedy yet the degree of additional protection afforded by the complete destruction of the organic constituents in the waste, as opposed to the selected remedy, is minimal in terms of risk to human health and the environment. Also, incineration is a relatively complex technology that would be more difficult to implement than the bioremediation process.

Alternative # 7, off-site disposal, would be protective of human health and the environment and attain ARARs. This alternative was not selected because the off-site disposal of contaminated materials without treatment is the least favored alternative

under CERCLA where practicable technologies are available. In addition, this alternative does not utilize a permanent solution and alternative treatment technologies to the maximum extent practicable. Finally, this alternative is significantly more expensive than the selected remedy.

XI. STATUTORY DETERMINATIONS

The remedial action selected for at the B&M Lagoons at the Iron Horse Park Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs and is cost-effective. The selected remedy also satisfies the statutory preference for treatment which reduces the mobility, toxicity or volume as a principal element. Additionally, the selected remedy utilizes a permanent solution and alternate treatment technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The remedy for the B&M Lagoons will reduce the risks posed to human health and the environment. Stopping the ongoing discharge to the lagoons will mitigate contaminant release to groundwater. Bioremediation will reduce the organic contamination in the soil and sludges to levels that ensure protectiveness: the treated material will pose less than a $1x10^{-6}$ excess cancer risk under the present and future industrial use of the area. Clean soil will cover the treated wastes to eliminate future exposure and risks associated with non-carcinogens. During the design of the remedy, measures to ensure that air emissions and odors are controlled will be identified and implemented during the remedial action phase of the cleanup. Any short-term risks associated with the remedial action are minimal and are greatly outweighed by the long-term effectiveness and permanence the remedy will provide.

B. The Selected Remedy Attain ARARs

This remedy will meet or attain all applicable or relevant and appropriate federal and State environmental laws and regulations. Environmental laws and regulations which are applicable or relevant and appropriate to the selected remedial action for the B&M Lagoons at Iron Horse Park are:

Massachusetts Regulations for the Land Application of Sludge and Septage (310 CMR 32)

Massachusetts Groundwater Discharge Permit Program (314 CMR 5.00)
Clean Water Act (CWA)
Clean Air Act (CAA)
Massachusetts Air Quality Regulations (310 CMR 6.00-8.00)
Executive Order 11990 (Protection of Wetlands)
Massachusetts Wetlands Protection Regulations (310 CMR 10.00)
Occupational Safety and Health Administration (OSHA)

These ARARs are discussed below.

Bioremediation of the Contaminated Soil and Sludges

With the exception of a Massachusetts requirement for pathogen reduction in sludge that is relevant and appropriate (310 CMR 32), there are no State or federal requirements that specify how the bioremediation process should be operated or what cleanup levels should be achieved. The pathogen reduction requirement will be met by the bioremediation process.

Groundwater

Stopping the discharge to the lagoons will meet applicable Massachusetts Groundwater Discharge Permit requirements.

Air

There are no federal primary or secondary air quality standards for chemical contaminants that may be released from the lagoons during the bioremediation process or after it is completed. However, federal National Ambient Air Quality Standards have been established for particulates that could be emitted during implementation of the remedy will be met (40 CFR 50.6 and 50.7). These requirements will be met during implementation of the remedy. In addition, Massachusetts air quality regulations establish allowable ambient levels (AALs) for many of the chemical contaminants found in the lagoon area (310 CMR 6.00-8.00). The air monitoring conducted by the DEQE on two separate occasions in 1986 indicated that the Massachusetts AALs are not presently being exceeded. Because the level of volatile organic compounds is very low in the contaminated soil and sludges, it is expected that these AALs will not be exceeded during the bioremediation process. During the design of the remedy, a more complete assessment of potential air emissions and odors will be conducted. Any necessary measures needed to ensure that the AALs are met and odors are controlled will be implemented.

Surface Water

Since the bioremediation process includes no discharges to surface waters, there are no federal or State requirements that have to be met.

Wetlands and Floodplains

Although no construction will be conducted in a wetland or floodplain, Section 404 of the CWA, Executive Order 11990 (Protection of Wetlands) and the Massachusetts wetlands protection requirements (310 CMR 10.00) will be met by assessing any impacts to wetlands and minimizing these impacts.

Land Use Restrictions

In order for the selected remedy to adequately protect public health, safety and welfare and the environment, a land use restriction will be recorded with the Middlesex County Registry of Deeds that indicates that the bioremediation process has been conducted and that the treated waste was placed into the lagoon area and covered. The restriction will further state that the lagoon area shall not be disturbed, in any manner, until and unless the State and federal authorities review plans for work in the lagoon area and determine whether or not the cover over the treated waste can be disturbed without creating an unacceptable risk.

OSHA

All applicable safety and health requirements established under the Occupational Safety and Health Act will be met for the on-site workers during the bioremediation process.

C. The Selected Remedial Action is Cost-Effective

The selected remedial action, which utilizes bioremediation, is cost-effective. It provides the best remedy in consideration of attainment of ARARs, short-term, long-term and overall protectiveness, implementability, reduction in toxicity, mobility and volume of the wastes, acceptance by the community and State and cost. Specifically, bioremediation would be more effective than all of the containment options considered and would result in the permanent reduction of organic contaminant levels. In addition, bioremediation would be easier to implement and less costly than the other treatment-based remedies that attained applicable or relevant and appropriate requirements. Although incineration would destroy all of the organic components in the

incineration would destroy all of the organic components in the waste, it would be more difficult to implement and would cost more than five times as much as bioremediation yet not provide a significant increase in protectiveness.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Stopping the ongoing discharge to the lagoons, reducing the levels of contaminants in the soil and sludges by bioremediation and decontaminating the lagoon system's pipes and pumps utilizes a permanent solution for the lagoon remediation. Additionally, bioremediation is an alternative treatment technology that is used to the maximum extent practicable.

E. The Selected Remedy Satisfies the Preference for Treatment as a Principal Element

The principal element of the selected remedy is the bioremediation of the contaminated soil and sludges. This element addresses the primary threat posed by organic contaminants at the B&M Lagoons and satisfies the statutory preference for treatment as a principal element.

XII. STATE ROLE

The Massachusetts Department of Environmental Quality Engineering (DEQE) has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Endangerment Assessment and Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. The Massachusetts DEQE concurs with the selected remedy for the B&M Lagoons at the Iron Horse Park Site. A copy of the declaration of concurrence is attached as Appendix C.